

Watershed Profile:

Whidbey and Camano Islands

The Place and the People

Island County is home to two large islands, Whidbey, the third largest island in the lower 48 states (after Long Island and Isle Royale), and Camano. The County also includes the three small islands of Ben Ure, Strawberry and Smith. Long and narrow, Whidbey Island rests at the east end of the Strait of Juan de Fuca and the northern edge of the Puget Sound. Skagit Bay lies between Whidbey and the mainland north of Camano Island, and Saratoga Passage is formed between Whidbey and Camano. Between Camano Island and the mainland lies a protected marine area called Port Susan. Taken together, this sheltered marine area provides a vital ecological asset to the Puget Sound region.

As glaciers retreated from the Puget Sound region, they left behind large deposits of rich glacial till. Over time the till has become fertile soil that supports farms and forests on Whidbey and Camano Islands. The till also formed bluffs that erode, feeding and nourishing the beaches, spits, and mud flats that drive a productive food web that supports animals from ghost shrimp to gray whales.

Whidbey Naval Air Station has two sections. One is on the northwest side of the island, looking toward the



Photo by Dominique Lewis.

San Juan Islands; the other is just to the east of Oak Harbor along the edges of Crescent Bay. Essential to the community and economy of this watershed, salmon recovery planners are committed to creating strategies that support and honor the naval presence on the island as they develop actions that support salmon recovery. Small towns like Langley and Coupeville, and the small city of Oak Harbor are concentrated along the islands' shorelines. These areas along with the unincorporated rural areas are home to business owners, military families, farmers, retired professionals, artists, and others who enjoy the rural quality of life found throughout the islands.

Sightseers from around the world flock to Deception Pass Bridge, which connects the north end of Whidbey Island to the mainland, to witness one of the Northwest's marine wonders. The 182 foot high bridge spans Deception Pass where powerful tides push boiling currents through a narrow channel. This confined gorge connects the Strait of Juan de Fuca to Saratoga Passage. Kelp beds line the sides of this marine pass, and eagles, seals, and heron forage for fish and other marine organisms that get stirred up in the swirling sea water.

Chinook populations that originate in watersheds throughout the southern and central parts of Puget Sound depend on the shorelines and marine waters of Island County. As juveniles heading out to the ocean and as adults returning to spawn, they use these waters and shoreline areas for refuge and feeding. With 212 miles of shoreline, these areas provide healthy marine, shoreline, estuary and coastal stream habitats to support Chinook salmon and other small non-commercial runs. Citizen stakeholders with support from Island County want to provide healthy conditions for these fish and other aquatic species that live in or pass through Island County waters.

The Island County Water Resources Advisory Committee (WRAC), 12 citizens appointed by the Island County Commissioners, serves as the citizens' committee for salmon recovery in Island

County. The Salmon Technical Advisory Group, a subcommittee of the WRAC, is the primary working committee for salmon recovery planning, project development and implementation. The WRAC, Island County Board of Commissioners and the Salmon Technical Advisory Group all endorsed the plan. As efforts move forward, work with staff from neighboring areas and other salmon recovery efforts will help to improve and refine the approach to salmon recovery.

In addition, the Island County Commissioners established a local Marine Resources Committee (MRC) and appointed citizen members in August, 1999. The 13 members represent a cross-section of the community — shore-land property owners, the Navy, local planners, environmental advocates, marine scientists, Washington State University's local extension program, two local port commissioners, recreational and commercial fishers, and farmers. The MRC is focused on improving marine health in Island County and plays an important role in Island County salmon recovery.

The Whidbey and Camano Island Salmon

Only coho salmon are known to spawn in streams within Island County and they are found on the southern part of Whidbey Island. Resident coastal cutthroat populations have been confirmed in several streams on Camano and Whidbey. Coho, chum, and Chinook juveniles have been documented in other streams on Whidbey and Camano islands, but Chinook spawning is not known in those streams. Juvenile Chinook from Skagit, Stillaguamish, Snohomish, Hood Canal, Lake Washington, Green, Puyallup, White and Nisqually rivers likely use Island County shoreline and marine habitats with regularity prior to moving off-shore to deeper waters. Skagit, Stillaguamish and Snohomish populations are probably the most abundant among these, and use the north and eastern shores of Whidbey and Camano as key habitats for foraging and rearing. Returning adults also use

these waters. Areas such as Admiralty Inlet and Possession Point are generally recognized by the Puget Sound fisheries community as being very important for migratory adults; many adults returning to Puget Sound rivers are also known to hold off the southern tip of Whidbey prior to entering their home rivers. Bull trout from the Skagit, Stillaguamish and Snohomish systems also use Island County nearshore as marine foraging areas.

Recovery Goals

The long-term goal is to achieve a net increase in salmon habitat through protection, enhancement, and restoration of naturally-functioning ecosystems that support self-sustaining salmon populations and the species that depend upon them. It is not feasible at this time to set quantifiable habitat targets that will result in salmon recovery. A process has been established that will help develop quantifiable habitat targets by 2010.

The WRAC and the Island County Commissioners believe it is necessary to find solutions that work for both fish and people. They believe that protecting neighboring private and public land uses and the surrounding environment, involving willing land-owners, not adversely impacting Naval operations, and providing significant benefits for salmon are critical components in achieving this balance. They believe salmon recovery can be an integral part of the county's economic and social structure if solutions are crafted that support these other multiple interests too.

Fish Population Goal

Chinook

Those supporting the plan acknowledge the Chinook planning targets developed by the Washington Department of Fish and Wildlife and local tribes as the overall quantifiable goals for Chinook recovery. The plan's habitat based goals, objectives and actions are designed in support of achieving these targets. In particular, actions are being designed that specifically support the Skagit, Stillaguamish

and Snohomish populations' use of the nearshore and estuaries. The salmon planning targets are put forth with the understanding that there is currently no means to quantitatively link habitat actions in the Islands to progress made toward the planning targets for the various Puget Sound Chinook populations.

Bull Trout

Island County nearshore and marine waters support marine foraging of independent populations of bull trout from the Skagit, Stillaguamish and Snohomish systems. The plan supports achieving the planning targets established for these populations. The WRAC believes that actions in the nearshore that improve habitat functions for salmon species will also support bull trout. Bull trout use some of the same habitats used by juvenile and adult salmon.

What is the current status of the populations in the Puget Sound Chinook Evolutionarily Significant Unit?

Chinook

The twenty-two Chinook populations that inhabit the Puget Sound Chinook Evolutionarily Significant Unit (ESU) are, taken together, currently at around 10% of the historic abundance.

What are the key factors contributing to the current status of the Puget Sound Chinook Evolutionarily Significant Unit?

Island County supports Chinook populations that migrate through and use the nearshore and estuarine waters for rearing. Thus factors are identified that contribute to the status of all populations migrating through Island County's nearshore and estuarine environments. These factors are described as a combination of the functions that different types of habitats provide for salmon and the habitat forming processes that create and maintain those functions. Examples of habitat forming processes

include sediment and freshwater transport processes and tidal processes. Examples of processes that affect habitat quality include transport of nutrients to the nearshore, the timing and quantity of freshwater entering the marine areas, and food web interactions. Habitats provide a range of functions, and these are often overlapping. These functions include refuge from large waves, strong currents, and predators; support of transition between fresh and saltwater; migratory corridors to and from the ocean, and food production.

Island County's estuarine and nearshore areas still have many remaining attributes that contribute to healthy habitat for Puget Sound salmon; compared to other parts of Puget Sound, this area has relatively low levels of human impact, with only 25% of its shoreline modified. Some of the last remaining stretches of functioning shoreline in Puget Sound are found on these Islands.

Nevertheless, human population growth has impacted the health of these shorelines and marine waters, and has impacted some types of habitats and processes more than others. Nearly 80 percent of the parcels that make up the county's 212 shore miles are developed or slated for residential development. More than 60% of the county's coastal lagoons have been isolated from natural tidal processes. When these natural processes are artificially changed, there is often a domino effect on the rest of the ecosystem.

As people develop the shoreline for residential and industrial purposes, they change its shape and structure. Wetlands were filled and diked, earth rearranged, and vegetation cleared to build homes and marinas along the shoreline. Tide gates have been installed along small stream outlets to prevent saltwater from flooding upstream as the tide comes in. Bulkhead and riprap have been installed to protect homes and property. These hardened areas prevent wave action from eroding sediment that feeds and nourishes beaches and eelgrass beds. In pursuit of water views, people keep riparian vegetation low or remove it entirely, reducing shade

needed for smelt and sand lance spawning habitat, and eliminating the source of leaf litter that feeds the insects that small salmon eat.

Juvenile salmon feed on forage fish, insects and other food found in estuaries, along the shorelines, and in the marine waters. It is in these environments that salmon grow big and strong enough to weather the ocean conditions they will face as adults. A forage fish is any fish eaten by a larger fish, seabirds or marine mammals. Forage fish are an important link in the marine food web because they transfer energy between primary and secondary producers, such as plankton, to top predators such as seabirds and larger fish. These forage fish are also important to the diet of juvenile salmon who feed on the smaller species or on the young of larger species. A number of nutrient sources, including leaky septic tanks, agricultural runoff, and sewage discharge from boats change the nutrient dynamics of the marine ecosystem. This, in turn, can change the species composition, and the food available to young salmon.

Various beaches in Island County are historic spawning habitats for two types of forage fish—sand lance and surf smelt—while a third, herring, spawn directly onto the lush vegetation in the many eelgrass beds that surround the islands. Bulkheads, docks, piers, jetties, and marinas from old and new residential and industrial activity change the shape of the beaches where smelt and sand lance lay their eggs. They also change how gravel and sand move along the shoreline, which can reduce the eelgrass beds in which herring lay eggs. These activities affect the survival of forage fish eggs. As populations slowly decline, the amount of food available to juvenile and adult salmon may be decreasing.

Upland development also changes the patterns of small creeks and streams that drain down to the saltwater. Culverts divert the flow of water and the way it carries sediment, impermeable surfaces like rooftops and parking lots change the quantity and timing of water flow, and non-point source pollution, like oil that is dripped onto driveways and



Photo by Dominique Lewis.

fertilizer spread on lawns, washes down creeks into the nearshore habitat. These changes can, cumulatively, affect the health of the estuarine and marine areas that fish need.

Future Threats

Largely residential, since commercial and industrial development has been limited to less than 1% of the shoreline, many human communities are located on sand and gravel beaches or along spits. These areas overlap with historic or current habitat for salmon and forage fish. Many of these beach communities were platted years ago, prior to the development of shoreline regulations, and are therefore exempt from these new regulatory protection measures. These communities are generally the areas of highest residential impact to the shore-

line. In many cases they are currently the focus of development or re-development activities which have the potential to be an opportunity or a threat.

Overall Approach to Recovery

The primary contribution to salmon recovery for this area will be through preservation, restoration, and enhancement of nearshore habitats and the ecological processes that form them. Through these actions, the goal is to achieve a net increase in healthy salmon habitat over time. The immediate focus is on preservation.

In developing the plan, the Salmon Technical Advisory Group (TAG) used a salmon life cycle model that connects fish at different stages of life to specific habitats. Current or potential high value habitats were further prioritized based on their distance from the three rivers that empty into the Whidbey Basin, a qualitative assessment of the number of Chinook and bull trout populations likely to use the shoreline, and whether or not the shoreline is included in a proposed

critical habitat designation. Protection, restoration and enhancement actions are then targeted to these areas. This plan does not yet identify a comprehensive prioritized list of sites or site-specific actions. Further inventory of current healthy habitats and processes, and an improved understanding of historic conditions will provide the scientific basis to set quantitative protection and restoration goals that link to viable salmonids population parameters and a list of site specific actions by 2010. The goal is to ensure protection of key habitats and processes and accomplish at least five restoration projects within the ten year timeframe.

Those in Island County are approaching recovery with an understanding that their watershed is inextricably linked to other areas and larger processes.



Photo by Dominique Lewis.

They acknowledge their connection to the Whidbey basin and the ten populations that first enter into saltwater around their shores. The plan cites a National Oceanic and Atmospheric Administration Fisheries study that states 50%, 75%, 65%, respectively, of the Skagit, Stillaguamish, and Snohomish planning areas are armored compared to only 25% of Island County. For this and other reasons, they understand a key role that protection of functioning habitat must play in their contribution to ESU recovery.

Key Strategies and Actions Supporting the Overall Approach to Recovery

To advance salmon recovery in the Whidbey and Camano watershed, planners have identified and prioritized geographic locations most important to Chinook, and identified the most important types of habitats nested within those geographic areas.

The top priority geographic areas include Deception Pass, Skagit Bay, and Port Susan, as these shorelines are within five miles of the mouths of the Skagit, Stillaguamish, and/or Snohomish Rivers. This combined area is likely used by the largest

number of Chinook juveniles during their nearshore migration from their home river. These shorelines are also primary pathways for migrating bull trout. Medium priority areas include Saratoga Passage, Possession Sound, Southeast Admiralty Inlet, and Northwest Whidbey Island. The west side of Whidbey south of West Beach and north of Double Bluff is included in a lower priority area because it is not adjacent to any of the rivers with Chinook populations and it is at the entrance to Puget Sound where most of the shoreline experiences high wave and current energy. Regional scientists think this area is a migratory corridor for salmon, and also contributes to the production of food salmon eat.

Within the priority geographic areas, high priority habitats include mud flats, marshes, and pocket estuaries. Marshes and pocket estuaries provide shelter from predators and refuge from high-energy waves, and are key areas for food production. Pocket estuaries allow young salmon's bodies to transition from a freshwater environment to a saltwater environment. Moderate priority habitats include sand flats, and sand and gravel beaches.

These habitats are often associated with eelgrass beds and provide habitat where forage fish can spawn. Both juvenile and adult salmon are frequently found feeding along these areas. Lower priority habitats include cobble beaches, rock cliffs, and man-made structures. While these habitats may be associated with eelgrass or kelp beds, they are frequently along shorelines that experience high-energy waves and currents. It is thought that salmon tend to migrate quickly through these areas.

In the context of these prioritized guidelines, the WRAC has established a set of strategic goals that will help coordinate and shape salmon recovery in the Whidbey/Camano watershed.

1. Over the long term, achieve a net increase in salmon habitat through protection, enhancement, and restoration of naturally-functioning ecosystems that support self-sustaining salmon populations and the species that depend on salmon.

This goal focuses efforts on protecting what remains in Island County and restoring habitats and processes where there is supporting scientific knowledge and local landowner and community commitment. Island County still retains a lot of high-quality nearshore and freshwater habitats that are at risk of degradation. Immediate focus on



Photo by Dominique Lewis.

these areas is a critical component of creating a foundation for recovery actions.

2. Develop a better understanding of habitat functions and the distribution of forage fish species, salmon, and marine mammals in the Whidbey/Camano watershed.

The WRAC and the TAG will work to fill key ecosystem data gaps by collaborating with state and federal agencies, contractors, and non-profits on research projects. Groups, including the Marine Resources Committee, will survey and regularly update the status of marine habitats and habitat forming processes like connectivity of feeder bluffs to beaches, size and locations of eelgrass beds, forage fish spawning beaches, shoreline armoring, the locations of stormwater outfalls, and other factors that affect the quality of salmon habitat.

In order to understand the connection between salmon recovery and other animals, the WRAC believes it is important to quantify and evaluate the effects of predation by marine mammals and other wildlife on salmon and forage fish populations. This includes learning more about the relationships between fish and Orca whales, sea lions, harbor seals, great blue heron, cormorants, humans, and others. The WRAC will participate in studies of predation on salmon and forage fish in hopes of understanding and establishing realistic levels of predation.

3. Engage an informed community in identifying, protecting, enhancing, and restoring salmon supporting ecosystem processes and habitats.

Because most of the shorelines are in private ownership, strong voluntary stewardship is critical to protection and restoration strategies. The WRAC knows it is important to educate the community about the habitats used by juvenile and adult salmon, the ecosystem processes that form healthy habitats, and challenges

that salmon face and then engage their creative thinking in finding solutions that work for them and for the fish. They plan to do this through development and implementation of a comprehensive strategy for community education and communication activities. Through this they hope to increase community participation in, and commitment to, salmon recovery activities. WSU-Beach Watchers and the Shore Stewards program are two examples of established programs designed to increase and support stewardship of shorelines by private property owners.

It will be necessary to address community concerns about the perceived loss of property rights and undue economic hardship caused by protection and restoration actions. Careful selection of protection, restoration, and enhancement sites in areas that have community support and on public lands will help demonstrate the benefits that can result from salmon recovery actions. Targeting actions in areas that are known to be important for salmon recovery will help satisfy community concerns about the cost-effectiveness of restoration projects.

4. Cultivate a supportive environment for salmon recovery by supporting policies that protect salmon habitats, advocating for adequate program staffing, encouraging cross-sector and public-private partnerships, pursuing adequate, reliable funding, and implementing effective project and program evaluations.

The WRAC plans to continue to play an active and supportive role in the community to help build the infra-structure necessary to contribute to salmon recovery. This includes staffing, seeking regular funding and encouraging cost-effective cross-sector and public-private partnerships. A key component of success will be the development and implementation of a salmon recovery adaptive management program. The program will include a set of ecosystem process and habitat indicators, a system to monitor trends, and regular summaries and reviews by technical staff and decision-makers.

Human Population Growth

The conceptual approach adopted for this plan places the highest immediate priority on protecting healthy nearshore processes and habitats. Voluntary protection actions form the foundation of additional protection actions needed for salmon recovery. This voluntary approach is taken because an underlying supporting condition is the suite of current land use regulations which provide significant protection for habitats that have not been altered. It is not yet clear what combination of regulatory, voluntary and incentive-based programs will adequately protect these areas.

The main strategy for ensuring habitat protection is to educate shoreline landowners about the importance of healthy nearshore habitats. Focusing first on properties slated for development or redevelopment, the WRAC will educate landowners about shoreline regulations and potential development impacts on nearshore habitats, encourage landowner participation in Shore Stewards and forestry programs, educate private property owners on practices that contribute to recovery, and pursue property acquisition in key locations.

Also critical to success will be the development and implementation of a private and public land protection strategy that focuses existing conservation programs (Shore Stewards, PBRS and conservation easements) on key parcels for salmon recovery. Developing an inventory of areas where open space and natural habitats may be subject to land-use conversions, and developing a prioritized action list to address this threat by 2006 will be a part of the acquisition strategy. Maintenance of freshwater and marine water quality will depend on promotion and implementation of pollution prevention strategies by the WRAC, local Conservation Districts, and other local and state agencies.

Harvest & Hatchery

While there are only limited hatchery operations in Island County, there may be negative interactions between wild and hatchery fish caused by these

and other hatchery programs. It will be necessary for others to research these ecological interactions and share findings that will help those in Island County refine and improve their current habitat strategies. Since Island County does not have jurisdiction over harvest management, it is assumed implementation of regional harvest strategies will aid in salmon recovery.

Results

The watershed plan for the Whidbey/Camano watershed was reviewed by the Puget Sound Technical Recovery Team (TRT: a group of seven scientists) and an interagency committee facilitated by the Shared Strategy staff. The TRT reviewed the plan to determine the degree of certainty that the plan can achieve recovery goals. The conclusions of this analysis are below. For the most part, the issues identified below by the analysis are discussed in the watershed plan to some extent, but the reviewers felt they merited particular attention or additional effort to increase the certainty of achieving plan outcomes. Where the analysis identified key uncertainties, proposals are included for consideration. If implemented along with the watershed plan's other actions, these proposals would increase the certainty of results and achieve the requirements for a recovery plan under the Endangered Species Act.

There are ten Chinook populations whose natal freshwater systems empty into the Whidbey basin. The Skagit River is home to six Chinook populations, the Stillaguamish home to two, and the Snohomish home to two. Together, these ten salmon runs form a key sub-region in the Puget Sound ESU. The results produced by the Whidbey/Camano plan are an important component to minimizing the risk to the overall ESU because most recovering salmon runs elsewhere in the Puget Sound face greater constraints than these populations.

This plan presents a good approach to prioritizing places to protect and identifying priority areas to

restore, by determining the importance of habitat types in specific geographic locations. The TRT applauds the use of the conceptual models outlining the hypotheses in Appendix F.

The overall goal stated in the plan is a net increase in healthy estuarine/nearshore habitat, which will benefit salmon significantly if accomplished. Because the habitat strategy is based in large part on implementing protection measures to achieve habitat improvements, the responses of the habitat and Chinook to different protection approaches should be closely tracked. Three of the four supporting goals deal with educating & involving the public and creating a political climate conducive to salmon recovery. The review team commends the Island County Board of Commissioners, the WRAC and the TAG for their commitment to the effort and their work to create a plan that will be implemented.

The plan identifies the need to coordinate with nearby watersheds (the Skagit, Stillaguamish and Snohomish) and the reviewers strongly encourage taking steps soon to implement this idea.

The certainty of achieving this plan's outcomes and the resulting contribution to overall ESU recovery will increase if the following issues receive focused attention as described below.

The following issues will be important to address through the adaptive management program (expected to be completed later this year). The Whidbey/Camano watershed plan is habitat based, though the planners recognize and acknowledge the work being done on hatcheries and harvest in other watersheds. One of the key uncertainties is that it is not clear how the stated habitat strategy relates to the hatchery and harvest management strategies. Specifically, it will be important to the success of this plan to estimate how hatchery fish use the Whidbey/Camano nearshore habitats (e.g., issues of competition and predation, implications of hatchery production, etc.) and estimate the capacity of the nearshore to support hatchery-origin and natural-origin Chinook and other salmon using

those waters. Since the plan does not discuss how the food web of Puget Sound (including hatchery salmon, any competitors, prey species or predators) will affect salmon recovery, and what strategies could be used to address these problems these are also important components to include. It is also necessary to design a monitoring program that assesses the response of salmon to recovery actions. Since this plan relies heavily upon existing regulatory and voluntary protection measures, it will be necessary to assess the effects of these measures on the biological results for fish and make adjustments as needed.

The planned strategies and actions will need to be linked to results for fish, the Viable Salmonid Parameters (VSP: abundance, productivity, spatial distribution, diversity)-to describe the expected outcomes from plan implementation. Once the linkage between the ecosystem principles, stressors, and geographic priorities are linked to VSP, then these four parameters can be used as a measure for monitoring.

The review process also identified a number of issues and uncertainties that are common to many Puget Sound watersheds. Strategies to address these issues that are contained in this local watershed chapter are a good approach, based on the current state of scientific understanding. Nevertheless, because (1) these issues are very important to the success of watershed approaches to recovery and (2) the effects of some of these strategies on salmon populations at watershed scales are relatively untested, these issues deserve particular attention. Reducing the uncertainties in

the issues below could come through local and/or regional inclusion in adaptive management and monitoring programs, regional or local pilot studies to explicitly test their effects, or through additional implementation actions. The complexities associated with these issues are discussed in the regional strategy section of this document or in the regional adaptive management and monitoring program. The “cross-watershed” issues identified are:

- The importance of habitat protection strategies and the need to assess the results for fish from the combination of protection tools available,
- The need to develop H-Integration strategies or, where they are included, to move them further along the integration continuum over time,

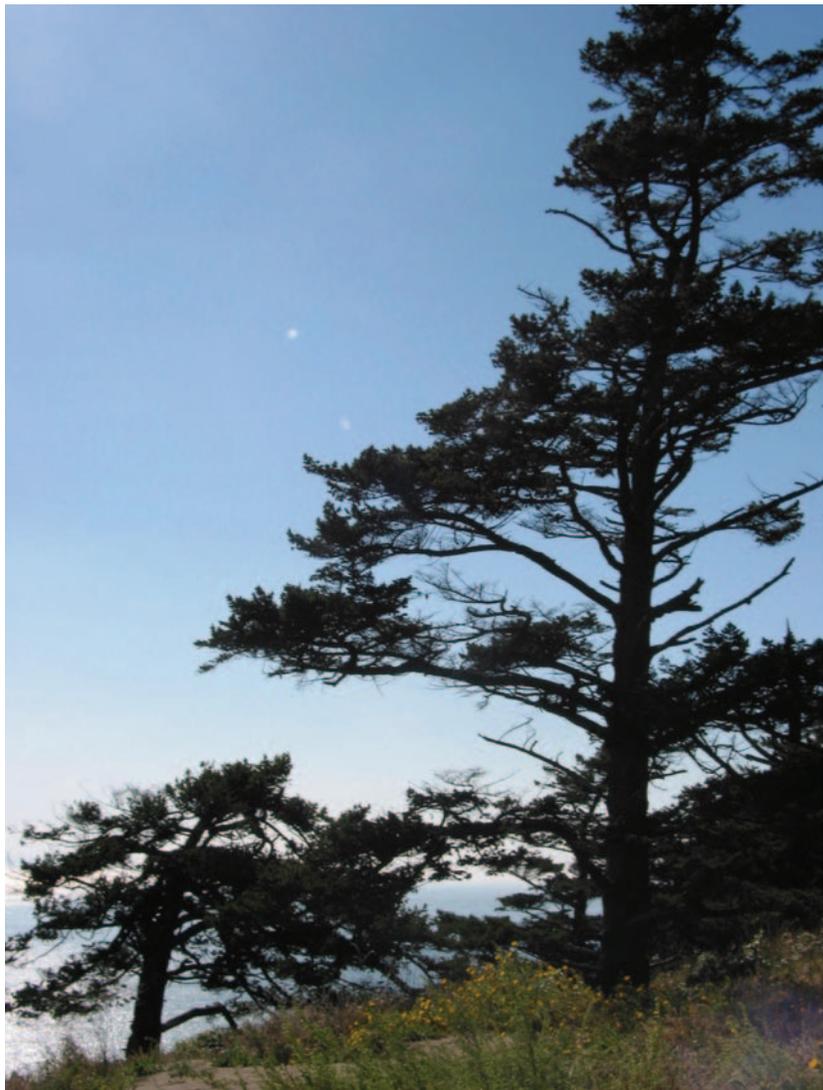


Photo by Dominique Lewis.

- The need to reconcile local nearshore strategies and actions with the regional nearshore chapter,
- The need to address water resources, both water quality and water quantity,
- The need to better link the effects of land use to habitat-forming processes and to habitat conditions. In turn, the effects of these changes in habitat, processes and landscapes on salmon populations need to be estimated,
- The need to develop or complete a robust adaptive management and monitoring program.

If the recovery plan is implemented and above uncertainties are addressed, this watershed will make an important contribution to the ability of Chinook salmon in the Puget Sound ESU to reach a recovered state.